

TAJ MAHAL IS ARCHITECTURAL SYMBOL OF ETERNAL LOVE AND GRIEF: NEW SEVEN WONDERS OF THE WORLD

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ABSTRACT

The Taj Mahal in Agra, India, is widely known as a timeless symbol of love. Mughal Emperor Shah Jahan built it as a white marble tomb for his favorite wife, Mumtaz Mahal, after she died in 1631.

KEYWORDS: Taj Mahal, Shah Jahan, Mumtaz Mahal, Sign of Love, Marble Mausoleum, Optical Illusion, Calligraphy, Quran, Tuluth script.

Overview: The **Taj Mahal** is an ivory-white marble mausoleum on the right bank of the Yamuna River in Agra, India. It was commissioned in 1631 by **Mughal Emperor Shah Jahan** [Shahab-ud-Din Muhammad Khurram; 5 January 1592 – 22 January 1666] to house the tomb of his favorite wife, **Mumtaz Mahal** [Arjumand Banu Begum; 27 April 1593 – 17 June 1631]. The Taj Mahal was built by the Mughal emperor Shah Jahan. Construction started in 1632 and finished around

1653. He built it to honor his favorite wife, Mumtaz Mahal, who died during childbirth, serving as an eternal tomb and symbol of his deep love and grief. The Taj Mahal is officially recognized as one of the **New Seven Wonders of the World**, having won the global vote in 2007. It is also a UNESCO World Heritage Site located in Agra, India, built by Emperor Shah Jahan.



Figure-1: Seventh wonders of world; Taj Mahal of Agra.

- The Taj Mahal is a famous historical monument located in Agra, Uttar Pradesh.
- It sits on the peaceful banks of the Yamuna River.
- Mughal Emperor Shah Jahan built it in loving memory of his wife, Mumtaz Mahal.
- It is universally recognized as a stunning symbol of

true love.

- The entire structure is made from shiny, pure white marble.
- It is proudly counted as one of the Seven Wonders of the World.
- The main building features a large central dome and four tall minarets.
- Beautiful green gardens and a reflective pool stand right in front of the main gate.
- It was designated as a UNESCO World Heritage Site in 1983.
- Millions of tourists from all over the world visit it every year.



Figure-2: Mumtaz Mahal, Tajmahal and Shah Jahan.

Built in: 1632 to 1648. Builder: Mughal Emperor Shah Jahan. Purpose: A tomb for his wife Mumtaz Mahal. Material: White marble with precious stones.

Ordered by **Emperor Shah Jahan**. Designed by a team of experts led by Persian architect **Ustad Ahmad Lahauri** [Master Ahmad of Lahore'; c.1580–1649]. Built by 20,000 workers and artisans. Started in 1632. Main tomb finished in 1648. Entire gardens and outer buildings finished in 1653. To hold the tomb of **Mumtaz Mahal**. To show deep love and sorrow after she died having a child. Over 20,000 workers helped make it. Made of white marble that changes color during the day.

- Visiting the Taj Mahal in the **early morning** at

sunrise offers soft pink and orange hues, cool marble, and fewer crowds. The gates open 30 minutes before sunrise, and most visitors on Reddit agree that arriving by 5:30 AM to 6:00 AM is ideal to beat the heavy midday rush.

- You can view the Taj Mahal at **night** only on five nights each month: the full moon night, two nights before, and two nights after.
- Experiencing the Taj Mahal on a **moonlit night** (chandni raat) is a magical event. The white marble glows softly in the moonlight. Night viewing is allowed only for five nights each month: on the full moon night, two days before it, and two days after it.

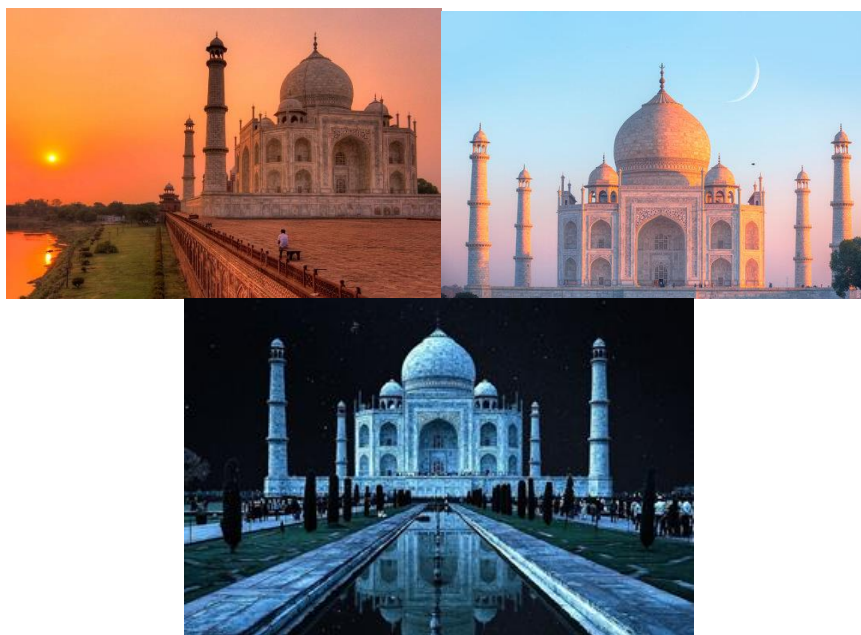


Figure-3: Tajmahal in dawn, morning and moonlit night.

Optical Illusion: The Taj Mahal features famous optical illusions at its main gate. When you look through the red sandstone arch, the monument appears massive and very close. As you walk forward, the building seems to shrink and move away because the surrounding space opens up. Stepping backward makes it look larger again.

Architectural Illusions

Shrinking Effect: Walking closer to the tomb makes it

look smaller instead of bigger.

Leaning Minarets: The four outer towers tilt outward slightly. This design keeps them from falling onto the main dome during an earthquake.



Figure-4: Chief Architect: Ustad Ahmad Lahauri [from Persia]

Optical Illusion: The famous "shrinking" optical illusion at the main gateway happens because the framed archway creates a fixed visual ratio. As you walk closer to the gate, your field of view expands past the frame, increasing the negative space around the monument and making the distant Taj Mahal appear to shrink. An optical illusion is an image or visual trick that fools your brain into perceiving something different from reality. They are grouped into three main categories: **literal illusions, cognitive illusions, and physiological illusions**. You can explore interactive examples and scientific breakdowns on the Michael Bach Optical Illusions Collection. An optical illusion in physics is a strictly physical phenomenon where light behaves in a way that creates a false visual image before the light even reaches the eye. Key examples include refraction, reflection, and scattering of light.

Bending of Light (Refraction): Light changes speed and direction when passing from one transparent material into another, like from air into water.

Varying Temperatures: Layers of air with different temperatures have different densities, which change the path of light rays.

Common Examples in Nature

Mirages: Hot air near the ground bends light from the sky, making it look like a pool of water on a hot road.

Bent Straw: A stick or straw placed in a glass of water looks broken or bent at the water's surface.

Apparent Depth: Objects submerged in water, such as a coin or fish, appear closer to the surface than they

actually are.

Main Types of Illusions

Literal Illusions: Create a brand new image by combining multiple smaller pictures.

Cognitive Illusions: Rely on your brain's assumptions, perspective, and past knowledge to misinterpret shapes or depth (like the famous face-or-vase drawing).

Physiological Illusions: Happen when excessive light, color, or movement overstimulate the eye and brain, creating temporary afterimages or warping effects.

Why They Happen

Brain Predictions: Your brain constantly tries to fill in missing gaps and predict what you are looking at based on past experience.

Neural Competition: Signals sent from your eyes to your brain can overload or trigger lateral inhibition in neighboring retinal cells, altering contrast and edges.

Lighting Adjustments: The brain automatically adjusts perceived colors based on surrounding context or inferred lighting before you are even conscious of it.

Why the Illusions Exist: Mughal architects used clever mathematical and visual tricks to make the Taj Mahal look perfectly balanced and uniform from every angle.

Shrinking/Growing Effect: When looking through the main red sandstone gateway, the large frame sets a false sense of scale. As you step toward the monument, the background structure seems to get smaller relative to the expanding doorway.



Figure-5: Optical Illusion.

Uniform Calligraphy: The Quranic verses inlaid on the walls get progressively larger the higher they are placed. This forced perspective cancels out distance distortion, so every line of text appears identical in size from the ground.

Outward-Leaning Minarets: The four corner towers tilt slightly outward rather than standing straight up. This prevents them from looking like they are leaning inward and ensures they fall away from the main tomb during an earthquake.

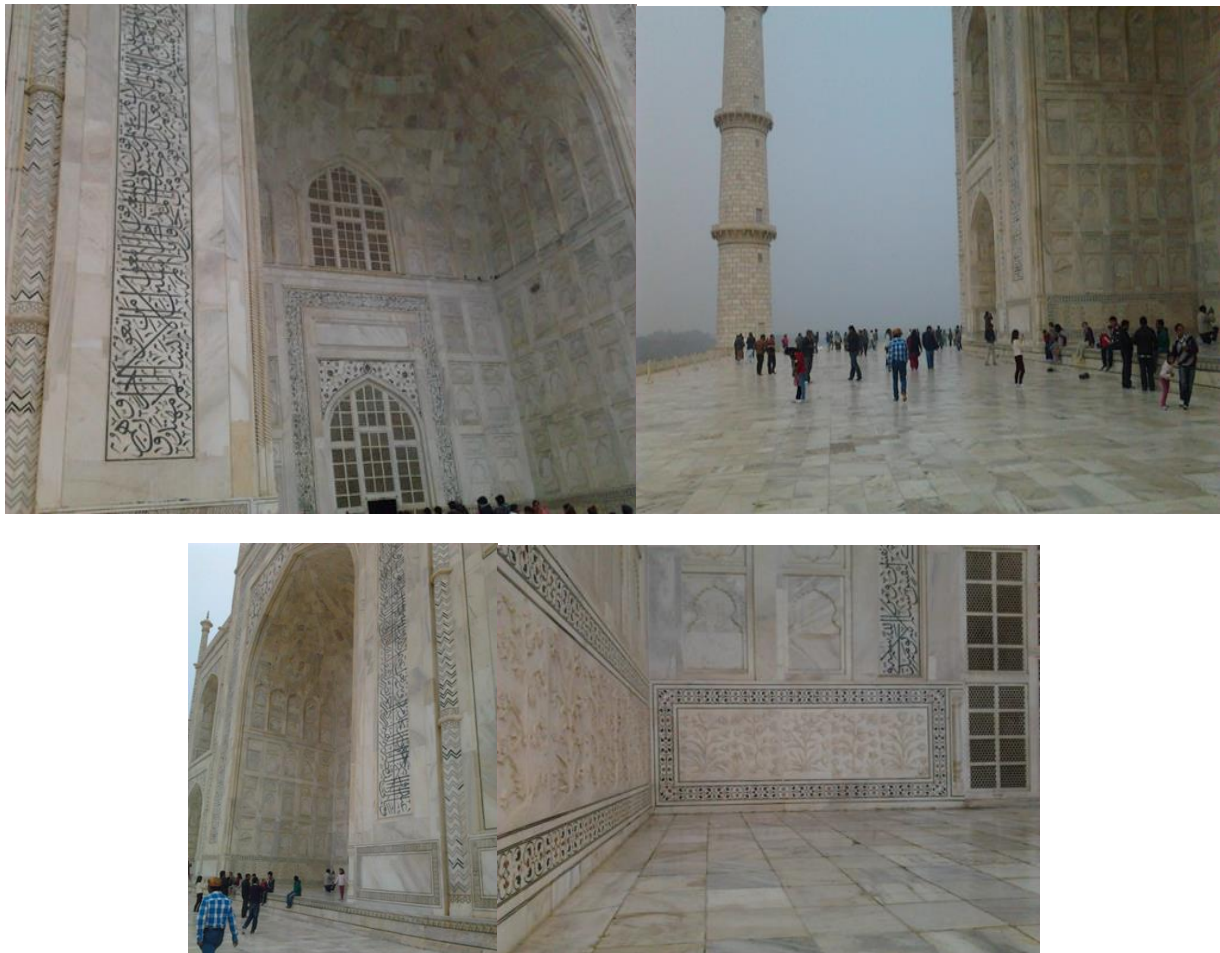


Figure-6: Refraction of light creating Optical Illusion.

Pillar Facades: The columns look like they have many complex sides with zigzag patterns. Up close, they are simple flat-faced structures with inlaid stones.

Calligraphy Trick: The Arabic text from the Quran inlaid on the gates looks uniform in size from the ground. The builders actually made the upper letters larger to combat perspective distortion.



Figure-7: Calligraphy Optical Illusion.

The inscriptions on the Taj Mahal are written in Arabic script, featuring verses from the **Holy Quran**. The language used for these religious texts and signatures by the master calligrapher **Amanat Khan** [1570–1644 or 1645] is Arabic, while the administrative and literary language favored in the Mughal court at the time was Persian. **The kiswa (or kiswah)** is the sacred black silk and gold-embroidered cloth that covers the **Kaaba** in Mecca, Saudi Arabia. It is replaced annually, features intricate Quranic calligraphy, and is crafted by hand at the specialized King Abdulaziz Complex for the Kiswa

of the Holy Kaaba. Key Facts about the Kiswa: Materials: Made from hundreds of kilograms of natural black silk, cotton lining, and tens of kilograms of real gold-plated and silver threads. Calligraphy: Adorned with a wide belt (hizam) and panels featuring Quranic verses and the Islamic declaration of faith (Shahada). Replacement: Traditionally changed every year around the Hajj pilgrimage or the Islamic New Year. History: The practice of draping the Kaaba dates back to pre-Islamic times and was embraced and honored by **Prophet Muhammad** [c. 570 CE – 8 June 632 CE].



Figure-8: Amanat Khan Calligrapher, Thuluth Script & Prophet Muhammad.

Calligraphy: The inscriptions on the Taj Mahal are written in Arabic script, featuring verses from the Holy Quran. The language used for these religious texts and signatures by the master calligrapher Amanat Khan is Arabic, while the administrative and literary language favored in the Mughal court at the time was Persian. Elegant *Thuluth* script in black marble inlay. Calligraphy is the art of making fine, stylized, and elegant handwriting or lettering. The word comes from Greek roots meaning "beautiful writing". It involves distinct

strokes where thin lines are made with light pressure and thick lines are made with heavy pressure. Tools and Materials: Pens and Brushes: Dip pens, fountain pens, quills, metal nibs, and flexible brush pens (like the Tombow Fudenosuke). Traditional Implements: Qalams (dried reed or bamboo pens) used in Islamic and Middle Eastern calligraphy. Paper: Smooth marker paper or specialty pads with grid and line guidelines to protect pen tips and keep writing straight.

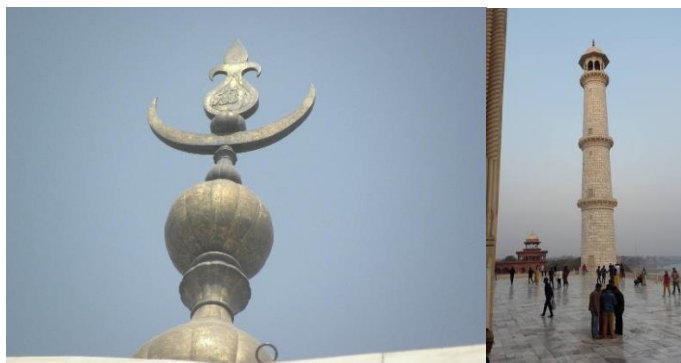


Figure-9: Dome & Pillar of Taj Mahal.

The top of the Taj Mahal's main dome features a decorative spire called a **finial**, which blends traditional Islamic and Hindu design elements and is topped by a heavenward-pointing crescent moon.

Design and Structure

The Finial: A 30-foot tall pinnacle sitting on the apex of the large onion dome.

Mixed Motifs: Combines a classic Islamic crescent moon with shapes resembling a traditional Hindu kalash (water pot) and coconut.

Original Gold: The original finial was made of pure gold and weighed hundreds of kilograms.

Replacements: British authorities replaced the gold structure with a copy made of gilded bronze and copper in the early 19th century. Written on the Taj Mahal are passages from the Quran, the **99 names of Allah**, and the signature of the master calligrapher, Amanat Khan. These inscriptions are inlaid in black marble using the flowing *Thuluth* script. Taj Mahal quartzite slabs are a heat-resistant and durable elegant natural stone with a close resemblance to marble, but it's less prone to scratching and chipping. It can be found in quarries all around the globe, but the best quality stone tend to come from Brazil. On top of the main dome of Taj Mahal was a finial, a rod with three globes and a crescent moon, a symbol of Islam. Originally the finial was made of gold, but it has been replaced by one of gilded bronze in the early 19th century. The top specialty of the Taj Mahal is its masterwork pietra dura inlay craftsmanship, featuring 28 varieties of rare precious and semi-precious gems hand-carved into pure white marble with absolute bilateral symmetry. Architectural and Artistic Highlights: Pietra Dura Inlay: Precious stones like lapis lazuli, jade, crystal, turquoise, and cornelian are embedded into floral and geometric patterns. Absolute Symmetry: Every element of the main mausoleum and gardens reflects a mirror-like balance, except for the asymmetric placement of Shah Jahan's tomb beside Mumtaz Mahal. Optical Illusions: The minarets slightly tilt outward so they protect the central dome during a collapse, and the inscribed Quranic verses adjust in size to appear uniform from the ground. The four pillars surrounding the Taj

Mahal in Agra, India, are minarets standing over 130 feet (40 meters) tall. Built completely symmetrical, they slant slightly outward on purpose. This smart design ensures that if an earthquake hits, the towers fall away from the main tomb and keep it safe. Called minarets, not simple pillars. Stand at the four corners of the main marble platform. Divided into three equal parts by two balconies. Topped with a small roof structure called a *chhatra*. Symmetry: They frame the central mausoleum to create perfect visual balance. Safety tilt: Each tower leans outward by roughly 2.5 degrees to protect the main dome during disasters. Tradition: Styled as working prayer towers found in Islamic architecture.

Content: Passages and chapters (surahs) from the *Quran*.

Artist: Designed and inscribed by the famed Mughal court calligrapher Abd-al-Haqq, also known as Amanat Khan [Amanat Khan Shirazi].

Details Script: Elegant Thuluth script in black marble inlay. Thuluth is a famous and beautiful style of Arabic calligraphy. The word means "one-third" in Arabic. It got this name because one-third of each letter slopes, or because writers used a pen one-third the size of a large master pen.

Curved lines: It replaced older, blocky styles like Kufic with smooth, flowing curves.

Interlacing: Letters often cross over or touch each other.

Vowel marks: It uses detailed marks and vowel signs to look full and decorated.

Common Uses: Mosque walls: You can see it carved or painted inside famous places like the Blue Mosque in Istanbul and the *Kaaba* in *Mecca*. **Book titles:** It was used for chapter headings in old copies of the Quran.

Flags: The text on the flag of Saudi Arabia is written in Thuluth.

Content: Passages and chapters (surahs) from the Quran.

Artist: Designed and inscribed by the famed Mughal court calligrapher Abd-al-Haqq, also known as Amanat

Khan.

CONCLUSION

The Taj Mahal in Agra, India, is a masterwork of Mughal architecture built between 1632 and 1653 by Emperor Shah Jahan. Its design uses strict bilateral symmetry, organizing the white marble mausoleum, red sandstone mosque, guest house, and Charbagh paradise gardens along a precise central axis. The Grand Layout: Arranged in geometric sections including a forecourt, a massive main gateway, a classic four-quadrant garden, and a riverside terrace. The Main Dome: Features a large onion-shaped white marble dome reaching 35 meters high, surrounded by four smaller domed kiosks (chhatris). The Four Minarets: Slender towers placed at the corners of the main plinth, designed with a slight outward lean so they safely fall away from the main tomb during an earthquake. Symmetrical Balance: Flanked on the sides by an identical red sandstone mosque to the west and a matching assembly hall (jawab) to the east to maintain visual harmony. Pietra Dura Inlays: White marble walls are embedded with precious and semi-precious stones like jade, jasper, and yellow marble forming floral and arabesque patterns. Calligraphy: Verses from the Quran are inlaid in black marble around the arched entryways (pishtaqs), subtly scaling larger higher up to look uniform from the ground. Resilient Foundation: Built near the Yamuna River over hundreds of deep wells packed with timber piles, rock, and lime mortar that gain strength in moisture-rich soil.

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